

which is twice the length of the eye or  $\frac{1}{4}$  the total length of the head, and conspicuously prominent beyond the mouth. Eyes circular, set high up on the side of the head, deep beneath a small transparent area of skin, a diameter and a half apart.

Anterior nostril a short wide tube situated inferiorly at the tip of the snout. Posterior nostril a large circular foramen just above the anterior orbital angle.

Mouth subrostral; its angle reaching slightly behind the vertical through the anterior border of the orbit; the jaws completely hidden by the very thick inflated lips. Villiform teeth in broad bands in the jaws, and in a broad, confluent, triangular patch covering the palate. Tongue free.

Gill-openings small, widely separated foramina, hardly larger than the eye; four gills with narrow laminae and coarse lamellae and wide clefts; no gill-rakers.

Integument thick, coriaceous, scaleless, investing the vertical fins and completely concealing their rays. The lateral line traverses the middle of the body.

Vertical fins confluent; the dorsal begins a distance behind the occiput equal to the length of the postrostral portion of the head, or just behind the level of the tips of the pectorals when laid full back. The anal begins immediately behind the vent. Pectorals small, pointed, equal in length to the rostrorbital portion of the head.

Stomach with a *cul-de-sac* of moderate size; intestine wide, little convoluted; liver large, indistinctly lobated, embracing the œsophagus. Air-bladder very large, with very thick spongy walls and a small central cavity.

Colours in the fresh state:—Body and fins uniform purple-black.

One female specimen, 17 inches long, with mature ovaries. Station 104, 1000 fathoms.

I am greatly indebted to Professor Wood-Mason for counsel and advice.

XXXV.—On the Ophidian Genus *Pseudoxyrhopus*, *Gthr.*  
By G. A. BOULENGER.

A CURIOUS snake from Madagascar was described by Jan in 1863 under the name of *Homalocephalus*, which name, being preoccupied in entomology, was changed by Günther to *Pseudoxyrhopus* in 1881. Jan placed his new genus among

the Coronellines and next to *Lamprophis*, which is regarded by Günther as related to the Lycodonts, a view which I share; Günther, on the contrary, was inclined to place it "with the larger and more-developed Colubers." But the remarkable dentition of the lower jaw does not appear to have been noticed by either author, an omission which accounts also for the fact that other species of the same genus have been described under the generic names of *Xenodon* (Peters), *Liophis* (Günther), and *Coronella* (Boulenger). This mandibular dentition points to affinity with the Lycodonts, near which I would place *Pseudoxyrhopus* in the system, with the following definition:—

Maxillary teeth 16 to 18, the two posterior strongly enlarged and separated from the preceding by an interspace; anterior mandibular teeth much larger than the posterior and increasing in size to the fifth, sixth, or eighth. Head scarcely distinct from neck; eye small, with round pupil. Body cylindrical; scales smooth, without pits, in 17 to 25 rows. Tail rather short; subcaudals all or part in two rows.

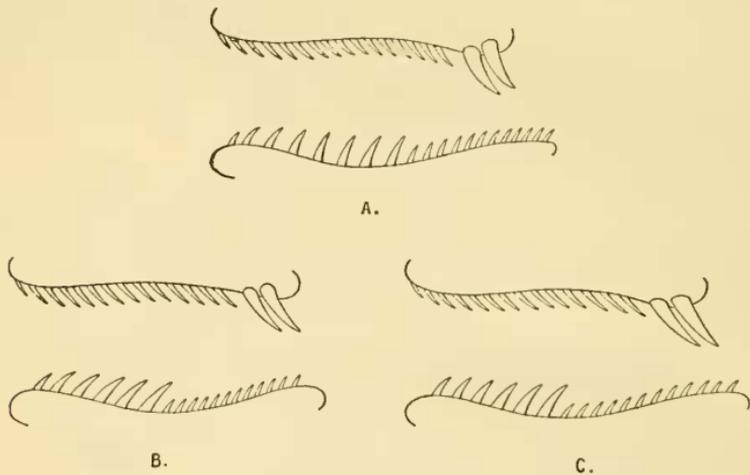


Figure showing the dentition of:—A. *P. microps*; B. *P. quinque-lineatus*; C. *P. imerinæ*.

Five species are known, which differ in the following characters:—

- A. Scales in 25 rows; frontal as broad as long; rostral just visible from above; two labials entering the eye; ventrals 207-225; subcaudals 45 ..... *P. microps*, Gthr.

- B. Scales in 21 rows; frontal a little longer than broad; two labials entering the eye.
- a. Rostral just visible from above; ventrals 155; subcaudals 35 ..... *P. heterurus*, Jan.
- b. Portion of rostral visible from above at least half as long as its distance from the frontal; ventrals 142; subcaudals 45-47 ..... *P. quinquelineatus*, Gthr.
- C. Scales in 19 rows; frontal longer than broad; portion of rostral visible from above half as long as its distance from the frontal; two labials entering the eye; ventrals 137-146; subcaudals 40-47 .... *P. imerinæ*, Gthr.
- D. Scales in 17 rows; frontal a little longer than broad; three labials entering the eye; ventrals 162; subcaudals 42 ..... *P. punctatus*, Ptrs.

All agree in the following points:—Supraocular not more than half the width of the frontal; loreal longer than deep; one præ- and two postoculars; temporals 1 + 2; anal divided.

*List of the Species.*

1. *Pseudoxyrhopus microps*.

*Pseudoxyrhopus microps*, Günther, Ann. & Mag. Nat. Hist. (5) vii. 1881, p. 359, fig.

Betsileo.

2. *Pseudoxyrhopus heterurus*.

*Homalocephalus heterurus*, Jan, Arch. Zool. Anat. Phys. ii. 1863, p. 286, and Icon. Ophid. xvii. pl. iv. fig. 2 (1866).

Madagascar.

3. *Pseudoxyrhopus quinquelineatus*.

*Liophis quinquelineatus*, Günther, Ann. & Mag. Nat. Hist. (5) vii. 1881, p. 359, fig.

Betsileo.

4. *Pseudoxyrhopus imerinæ*.

*Coronella microps*, Boulenger, Ann. & Mag. Nat. Hist. (6) i. 1888, p. 104, pl. v. fig. 4.

*Liophis imerinæ*, Günther, Ann. & Mag. Nat. Hist. (6) v. 1890, p. 71.

Imerina.

*L. imerinæ* is the adult of the previously described *C. microps*, which name, however, is preoccupied by *Pseudoxyrhopus microps*, Gthr.

5. *Pseudoxyrhopus punctatus*.

*Xenodon punctatus*, Peters, Mon. Berl. Ac. 1880, p. 221, pl. —. fig. 3.

Stated to be from Brazil, but its habitat will probably prove to be Madagascar. I am indebted to Dr. Paul Matschie, of the Berlin Museum, for a sketch of the dentition of the type specimen, which shows the fourth and fifth mandibular teeth enlarged.

XXXVI.—*A New Theory of Pterichthys*.

By A. SMITH WOODWARD, F.Z.S.

THE missing link between the Chordata and some of the non-Chordate phyla below has long been sought in vain among the organisms revealed by palæontology. The almost invariable destruction of soft tissues during fossilization evidently constitutes the chief obstacle to the quest; and it still seems most probable that none of the intermediate types developed hard skeletal parts such as could be preserved under ordinary conditions. There is, however, one anomalous group of early Palæozoic skeletons which has been almost invariably referred to in this inquiry, *i. e.* the tribe comprising *Pterichthys*, *Bothriolepis*, *Cephalaspis*, and their allies. At the time of their first discovery the superficial aspect of these skeletons at once led to their comparison with the contemporaneous Eurypterids, then believed to be Crustaceans; somewhat later they entered the heterogeneous order of "Ganoid" fishes; still further investigation led to a suggestion that they might possibly be a primitive armoured form of Marsipobranch fish; and a few years ago *Pterichthys* and *Bothriolepis* were compared by Cope\* with the shielded types of Tunicates, *e. g.* *Chelyosoma*.

Quite recently an attempt has been made to show that this gradual growth of ideas has proceeded in a wrong direction; and a well-known investigator of the morphology of Arachnida, Mr. William Patten, now claims † to justify, on philosophical grounds, the first impressions of the earliest collectors. In the modern acceptance of the term, Trilobites and Merostomata are Arachnids; and it is in this direction, according to

\* E. D. Cope, "The Position of *Pterichthys* in the System," Amer. Nat. vol. xix. (1885), pp. 289-291, with figs.

† W. Patten, "On the Origin of Vertebrates from Arachnids," Quart. Journ. Micr. Sci. vol. xxxi. (1890), pp. 359-365, fig. 13.